Tevatron Electron Lens II

CRYOGENICS

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Goal of Cryogenic Work

Provide cryogenic service to TEL-2 at minimal cost while maintaining current or better efficiency of the Tevatron cryogenic system.

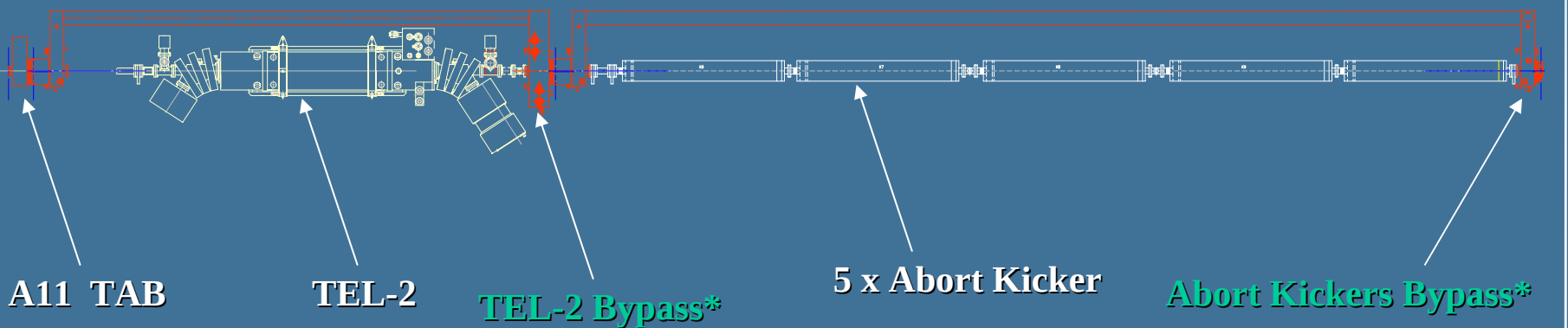
Cryogenic Design Considerations

- TEL-2 Heat Leak
- Affect of the String Temperature Profile
- TEL-2 quench implications
- TEL-2 controls and instrumentation
- Minimize number of new components

CRYOGENIC LAYOUT

- **Working with Mike McGee, AD/MS on the final beamline layout**

Conceptual layout



* - New Components

Scope of Cryogenic Work

- **Design and Construction of Non-magnetic Cryogenic Elements**
  - ⌘ *Abort Kicker Bypass*
  - ⌘ *TEL – 2 Bypass*
  - ⌘ *U-tubes*
- **Instrumentation and Controls for the TEL-2**
  - ⌘ *Power Leads Flow Controls and Instrumentation*

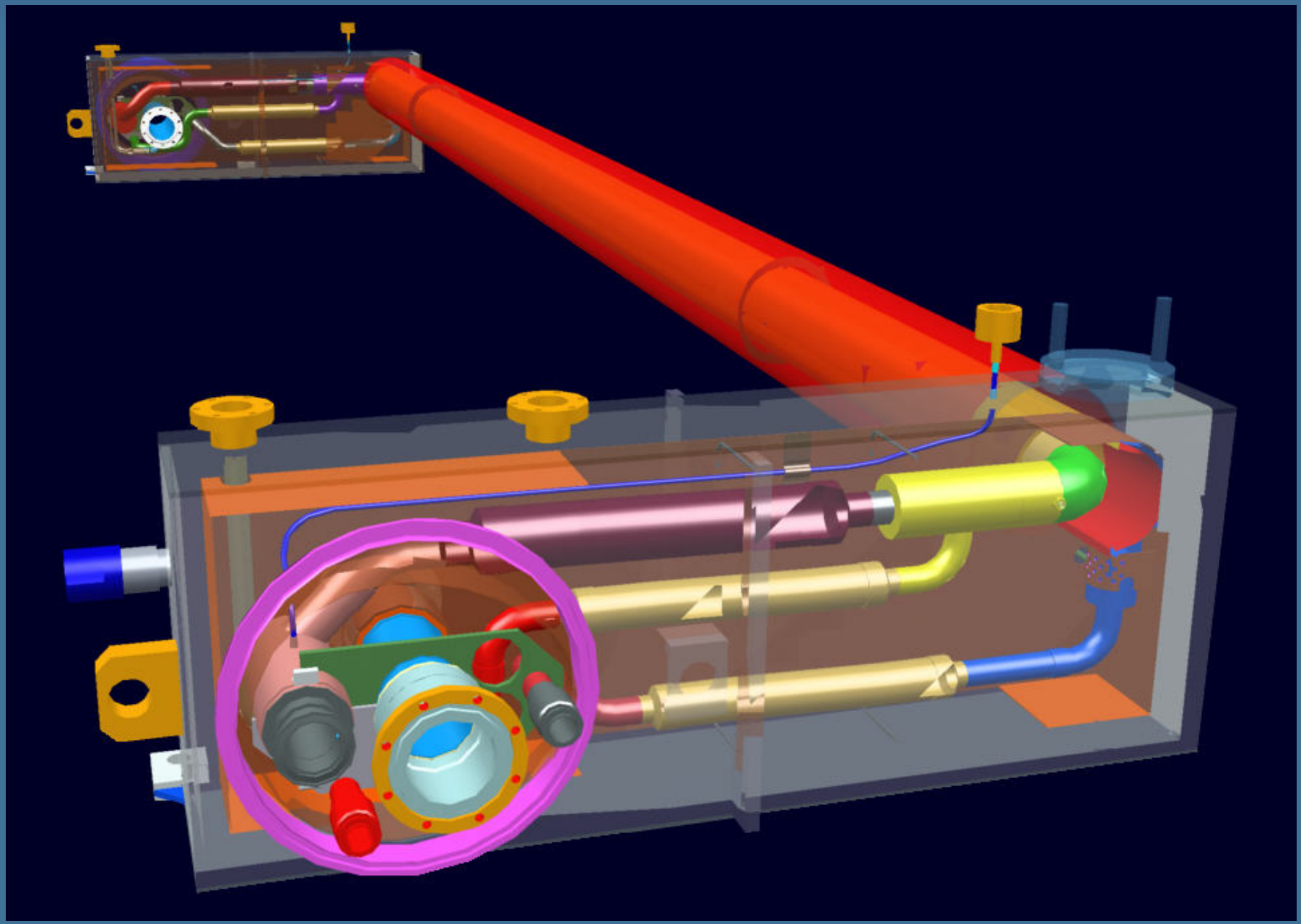
Helium and Nitrogen Headers Modification

- ⌘ *Extend or reroute headers to support new and moved components*

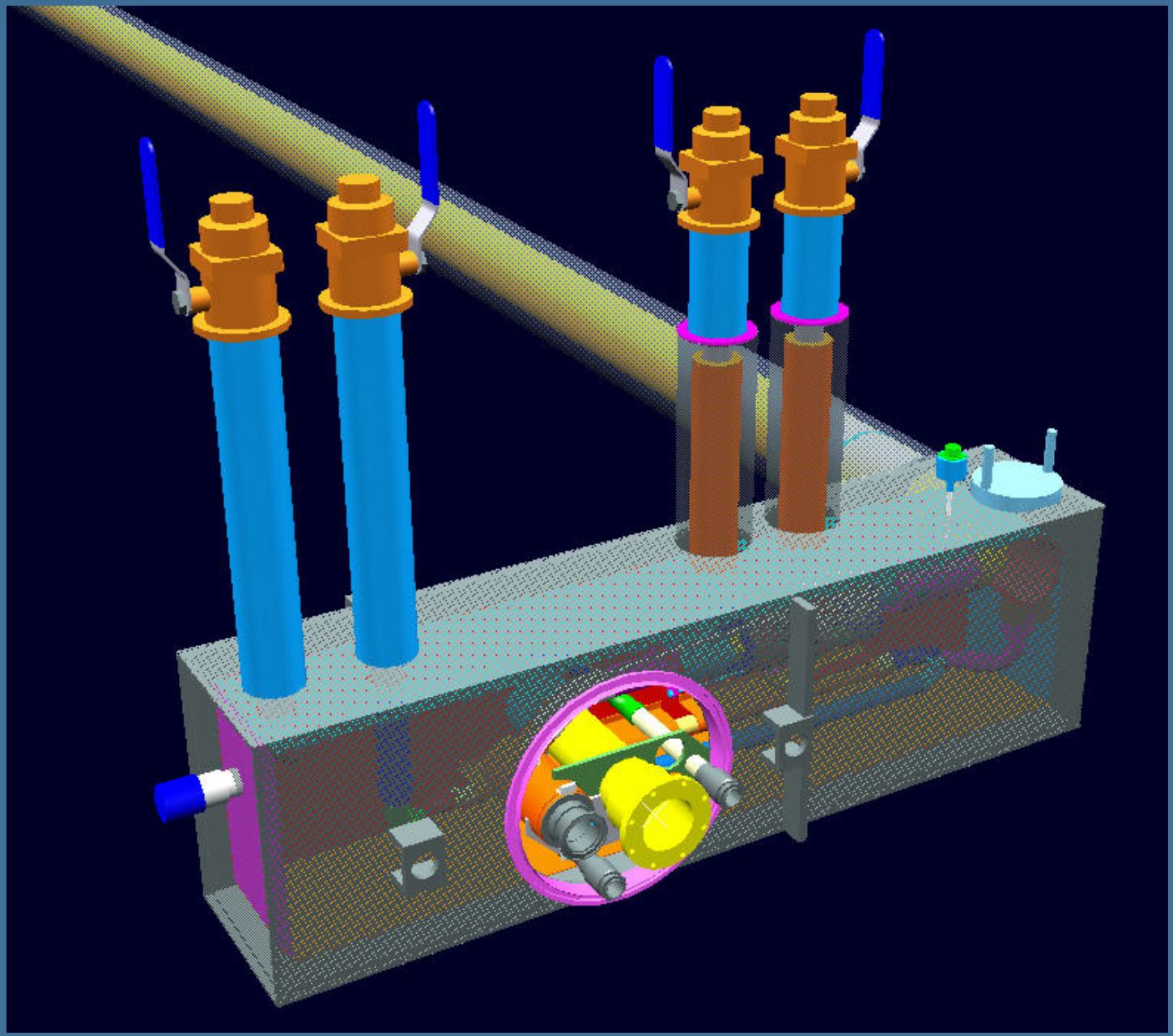
Current Design Status

Device	Solid Model	Details	Parts List
Abort Kicker Bypass	100%	80%	0%
TEL-2 Bypass	80%	80%	0%
Helium and Nitrogen Headers	-	-	0%
Controls	-	-	0%

Abort Kicker Bypass Solid Model



TEL – 2 Bypass Solid Model



COST*

Item Description	M&S [k$]	AD Labor [FTE m-year]
TEL –2 Bypass	25	0.5
Abort Kickers Bypass	25	0.5
U-tubes	5	0.2
Controls and Instruments	5	0.3
Total	**60**	**1.5**

* - No spares are included

SCHEDULE

- Bypasses Design Completed – March 2005
- Bypasses Construction Completed – July 2005
- U-tubes Construction Completed – July 2005
- Installation – next Tevatron Shutdown

RISK ANALYSIS

Risk	Mitigation
High TEL-2 heat leak	Identical to TEL-1 design. Extra cryogenic capacity is available.
Increased J-T inlet temperature	TEL-2 bypass serves as single-phase to two-phase heat exchanger.
Component design errors	Based on existing Tevatron component design.
Availability of existing personnel resources	Long-term planning of departmental resources.
Installation scheduling	Departmental and overall project planning. Installation shutdown planning.